EDUCATION FLIGHT PROJECTS (EFP)

Administered by Oklahoma State University (OSU)
Type of Agreement: Teaching From Space Cooperative Agreement

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PROJECT DESCRIPTION

The project's strength is its capability to highlight the Agency's missions and connect education audiences to NASA content, people, and facilities. EFP activities involve K-12 students and educators in hands-on experiences and research applications aboard a variety of NASA flight platforms and in NASA ground-based research facilities. Activities offer NASA-unique science, technology, engineering and mathematics (STEM) content, resources and opportunities for both the formal and informal education communities. The project is national in scope and open to educators and students in grades K-12. EFP is managed by the Teaching From Space (TFS) office located at the NASA Johnson Space Center.

EFP offers opportunities for educators and students to actively participate in NASA missions on the Space Shuttle, the International Space Station (ISS), and other NASA flight platforms or through hands-on experiences at NASA Center laboratories and test facilities. These diverse experiences are intended to inspire, engage, and educate K- 12 students and teachers and offer them unique NASA-related STEM content and resources.

EFP recognizes that well-trained and highly motivated educators are essential to increasing student interest and achievement in STEM. The project provides short and long duration educator professional development, both face-to-face and electronically. EFP sees value in providing educators non-traditional professional development by taking them out of the classroom and offering real world experiences. The project gives educators rich opportunities to interact and work with personnel at NASA Centers and to use the Agency's exceptional resources. In FY10, EFP professional development activities utilized multiple NASA facilities and flight platforms including the reduced gravity aircraft; a NASA research aircraft; and a microgravity drop tower.

EFP student activities are diverse and incorporate NASA-specific STEM content and highlight STEM-related careers. These activities allow students to engage in NASA missions through hands-on and authentic experiences. In FY10, students took Earth photographs from the ISS; interacted real-time with ISS and Space Shuttle crews; developed and flew experiments on NASA weather balloons; sent their signatures to space; and launched rockets to approximately one mile above the ground.

EFP seeks to continually increase, improve, and diversify its portfolio of ground-based and on-orbit education activities. In FY10, the project issued its second internal call for proposals with the intent to fund development of new or expand the scope of existing education flight activities. Eleven diverse activities based at seven NASA Centers were funded and became part of the EFP portfolio.

EFP recognized the need to create "one-stop shopping" Web sites for educators and students interested in specific topics. In FY10, the project launched three new comprehensive education Web sites focused on robotics, rocketry, and NASA careers. The sites provide educators and students easy access to topic focused resources including lesson plans, interactive multi-media, and upcoming challenges and workshops.

In FY10, TFS assumed management of all ISS National Laboratory K-12 education activities. The office facilitated the launch of Kids in Micro-g, a student experiment design challenge. This challenge gives students in grades 5-8 the opportunity to design an experiment or simple demonstration that could be performed both in the classroom and on board the ISS. As part of its National Laboratory responsibilities, TFS supported collaboration with LEGO for on-orbit education activities including sending LEGO kits to the ISS and development of procedures for astronauts using the kits. Video footage of astronauts using the kits will be used in education videos.

The project coordinates on-orbit education activities including payloads and demonstrations on both the Space Shuttle and the ISS. These on-orbit education activities are used, both internally and externally, in the creation of education resources for educators and students. In FY10, EFP partnered with Sesame Street to film four educational videos on the ISS. These video segments were aired on Sesame Street throughout the fall.

EFP is also responsible for the design, development, and execution of comprehensive long-term national education plans associated with specific Space Shuttle missions, particularly those on which an educator astronaut flies. In FY10, EFP had overall responsibility for the STS-131 education plan that included pre-mission, mission, and post-mission components and ground-based and on-orbit activities.

In FY10, EFP partnered with other national NASA Education Projects to facilitate unique opportunities for students and educators. A key collaboration is with NASA Explorer Schools (NES). EFP assumed greater responsibilities for the development of NES content and promotion of the project's activities. EFP supported the launch of the newly re-designed NES program by representing the JSC region and coordinating with other NASA education activities to develop several electronic professional development modules.

EFP serves as the primary NASA Office of Education interface to the Astronaut Office and facilitates communication between the two organizations. The office frequently offers support and guidance to astronauts and office management on education-related activities and questions.

PROJECT GOALS

EFP is focused on increasing K-12 student interest and achievement in STEM. The project achieves this goal by offering unique NASA experiences to students and educators. Recognizing that hands-on, interactive, authentic experiences are effective learning tools, EFP provides the Agency with rich opportunities to inspire, engage, and educate the Nation's students and educators. Student and educator participation in NASA-unique education flight activities directly contributes to NASA Education efforts to attract and retain students in STEM disciplines and strengthen NASA and the Nation's future workforce.

The vision for EFP is to: *Facilitate education opportunities that use the unique environment of spaceflight and other flight platforms.*

The project will meet the following objectives:

1. Develop and provide NASA-unique experiences, opportunities, content, and resources to educators and students to increase K-12 student interest in STEM disciplines.
2. Build internal partnerships with NASA Program Offices and NASA Education programs and external partnerships with formal and informal education communities to create unique learning opportunities and professional development experiences.

PROJECT BENEFITS TO OUTCOME 2

EFP goals align to Outcome 2 in the 2006 NASA Education Strategic Coordination Framework (www.nasa.gov/offices/education/performance/strategic_framework.html). EFP directly contributes to: *Outcome 2 – Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.* EFP reaches K–12 educators and students through authentic real-world, hands-on, and interactive education flight activities. The project offers "as only NASA can" experiences that focus on STEM disciplines and highlight NASA missions, content, and careers. The project collaborates with other NASA Education projects, Mission Directorates, Center Education offices, and external partners to increase the value and scope of these activities.

EFP activities offer NASA Education outstanding opportunities to implement recommendations from the National Research Council's (NRC) Review and Evaluation of NASA's Precollege Education Program Project activities are NASA unique and "capitalize on NASA's primary strengths and resources" including "the agency's scientific discoveries; its technology and aeronautical developments; its space exploration activities; the scientists, engineers, and other technical staff (both internal and external) who carry out NASA's work; and the unique excitement generated by space flight and space exploration." (Reference: 2008 NRC Report (www.nap.edu/catalog.php?record_id=12081).

In FY10, EFP significantly contributed to Outcome 2 by promoting increased educator and student involvement in education flight activities. The project encourages participants to use these high visibility experiences to engage greater numbers of educators and students, the media, the community, families, and legislators involved in NASA missions. The project is innovative, continually seeking new ways to improve and enhance the value of project activities and incorporate current trends in the use of multi-media and new technologies to engage greater numbers of educators and students. Because many EFP activities are dependent on mission operational requirements, the total number of participants may vary each fiscal year.

The project continually evaluates its activities to insure that they are effective and successfully support Outcome 2. EFP works with each project activity to improve its individual contributions to Outcome 2. EFP provides guidance on requirements, expectations, and data collection, which result in increased benefits to Outcome 2.

PROJECT ACCOMPLISHMENTS

- Managed a portfolio consisting of fourteen education activities implemented at seven NASA Centers and through external partnerships
- Released an internal call for proposals to identify potential partnerships with Agency education flight projects, specifically those that provide educators and student hands on experiences, participation, and research applications on-board NASA flight platforms
- Led Agency efforts to use the flights (STS-131) of educator astronauts as extraordinary opportunities to inspire and engage educators and students by developing national education and promotion plans including a national call for education downlink proposals
- Assumed management of all ISS National Laboratory K-12 education activities
- Launched three topic focused Web sites including robotics, rocketry, and NASA careers
- Managed seven Web sites that received over 736,213 page views in FY10
- Played a major role in the implementation and success of Summer of Innovation
- Conducted six on-orbit demonstrations that were used by TFS, and internal and external organizations in the production of educational videos
- Facilitated fourteen In-Flight Education Downlinks reaching over 65,000 students and educators
- Conducted three EarthKAM missions involving 420 educators and 29,629 students
- Conducted fifty-four Amateur Radio on the International Space Station (ARISS) contacts reaching almost 60,000 participants around the world
- Partnered with Lockheed Martin on Signatures in Space sending 550,000 student signatures were sent to space
- Coordinated an education downlink for the US Department of Education for International Education Week; the US Secretary of Education and the NASA Administrator participated in the event
- Collaborated with the Astronaut Office to develop innovative ways to support crew requests
- Received a JSC Innovation Award for the development of a the Web Site design template and the associated strategy to engage each NASA Center and JPL in the promotion and use of the sites

PROJECT CONTRIBUTIONS TO PART MEASURES

PART Measure (short duration professional development) – Percentage of elementary and secondary educators who obtain NASA content-based resources or participate in short-duration NASA education activities and use NASA resources in their classroom instruction.

Through short duration professional development experiences, EFP reached a total of 10,177 educators. Of that total number, 6,659 educators' primary NASA relationship is with another K-12 project. This overlap reflects EFP's synergistic connection with other projects, and its strong commitment to serving both internal and external audiences.

PART Measure (long duration professional development) – Percentage of elementary and secondary educators who participate in NASA training programs and use NASA resources in their classroom instruction

Through long duration professional development experiences, EFP reached a total of 117 educators.

PART Measure (Students) – Number of elementary and secondary student participants in NASA instructional and enrichment activities

In FY10, EFP reached 111,024 K-12 students. Of that total number, 28,277 students were already involved in other NASA K-12 projects. This overlap reflects the value of the EFP portfolio in supporting the goals and objectives of other K-12 projects focused on reaching students.

IMPROVEMENTS MADE IN THE PAST YEAR

EFP continues to develop and refine models for the project. Building on the successful internal call for proposals in FY09, the project released another call in FY10. Processes for the selection of new education activities continue to be improved.

EFP created a strong model to design, develop, and promote topic focused Web sites that provide one-stop shopping for students and educators. In FY10, lessons learned were incorporated into the three new Web sites. An example is the resource kits that were sent to each NASA Center for use in education outreach related to the Web sites. Using feedback from NASA colleagues, the demonstration items were constructed of more durable materials and the activities were mapped to specific grade levels and standards.

EFP continues to work to improve communication within its portfolio, with NASA Center Education Offices, and with identified EFP points of contact at each Center. The project developed and implemented an electronic monthly reporting system for collaboration partner and Center POCs. The new system has increased data collection accuracy and ensures consistent communication and proactive support for portfolio activities. The project continues to refine its processes to obtain evaluation data through the NASA Office of Education evaluation system.

The project assesses activities and seeks input from evaluation experts in an effort to continually improve its contributions to Outcome 2. In FY10 the project commissioned professional evaluations of two EFP activities, Reduced Gravity Opportunity (RGO) Flight Week and Amateur Radio on the ISS (ARISS). The evaluations were conducted by Technology for Learning Consortium Inc. and identified both strengths and weaknesses of each activity. Both evaluations will assist EFP in conducting more successful activities.

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

EFP management works closely with Oklahoma State University (OSU), through the Teaching From Space (TFS) Cooperative Agreement (#NNX09AC24G), on all elements of the project. OSU provides the highly skilled TFS staff that is responsible for daily EFP operations. OSU supports major project initiatives as well as the continuous evaluation of the project's activities.

EFP recognizes that partnering with other NASA Education projects and activities is mutually beneficial and has the potential to increase the worth and reach of all associated projects and to result in enhanced continuity between NASA Education portfolio elements. The project also seeks opportunities to work with NASA Center Education offices and Mission Directorates to develop and deliver EFP activities. The project works closely with appropriate NASA Program and Project Offices, to identify flight opportunities, and content for and subject matter experts to participate in the project's activities. EFP also collaborates with external education organizations to expand the scope and value of its activities. Key internal and external partners in FY10 included: Sesame Street, US Department of Education, Sally Ride Science, NASA Endeavor Science Teacher Certificate Project, United States Navy, NASA Explorer Schools (NES), Science, Engineering, Mathematics and Aerospace Academy (SEMAA), Canadian Space Agency (CSA), Japan Aerospace Exploration Agency (JAXA), National Science Teachers Association (NSTA), NASA Digital Learning Network (DLN), Lockheed Martin, NASA eProfessional Development, NASA Educator Resource Center Network, NASA Aerospace Education Services, Space Operations Mission Directorate, Exploration Mission Directorate, National Air and Space Museum, Boy Scouts of America, and Space Center Houston.